

WHAT IS CLAIMED IS:

1. A black ink for ink-jet recording, comprising a dye dissolved and/or dispersed in an aqueous medium, wherein the dye has a λ_{max} of 500 to 700 nm and a half value width of 100 nm or more in an absorption spectrum of a dilute solution normalized to an absorbance of 1.0,

wherein the black ink has: a transition metal ion content of 0.1 mmol/l or less; and a forced fading rate constant k_{vis} of 5.0×10^{-2} [hour⁻¹] or less, in which the forced fading rate constant k_{vis} is decided by printing a black square symbol of JIS code 2223 in 48-point by using the black ink, measuring a reflection density D_{vis} of the printed symbol through a status A filter to obtain an initial density, forcedly fading the printed symbol by an ozone fading tester capable of continuously generating 5 ppm of ozone, and determining the time taken until the reflection density D_{vis} reaches 80% of the initial density.

2. A black ink for ink-jet recording, comprising a first dye and a second dye dissolved and/or dispersed in an aqueous medium, in which the first dye has a λ_{max} of 500 to 700 nm and a half value width of 100 nm or more in an absorption spectrum of a dilute solution normalized to an absorbance of 1.0 and the second dye has a λ_{max} of 350 to 500 nm in an absorption spectrum of an aqueous

solution, wherein the black ink has a transition metal ion content of 0.1 mmol/l or less.

3. A black ink for ink-jet recording, comprising a dye dissolved and/or dispersed in an aqueous medium, wherein the dye has a λ_{max} of 500 to 700 nm and a half value width of 100 nm or more in an absorption spectrum of a dilute solution normalized to an absorbance of 1.0,

wherein the black ink has a transition metal ion content of 0.1 mmol/l or less; and a ratio R of 1.2 or less, in which the ratio R is defined as a ratio of a maximum value to a minimum value of a forced fading rate constants k_R , k_G and k_B that are decided by printing a black square symbol of JIS code 2223 in 48-point by using the black ink, measuring reflection densities D_R , D_G and D_B of the printed symbol with respect to 3 colors of C (cyan), M (magenta) and Y (yellow) through a status A filter to obtain initial densities, respectively, forcedly fading the printed symbol by an ozone fading tester capable of continuously generating 5 ppm of ozone, and determining the times taken until the reflection densities D_R , D_G and D_B reach 80% of the initial densities, respectively.

4. A black ink for ink-jet recording, comprising

a dye dissolved and/or dispersed in an aqueous medium, wherein the dye has a λ_{max} of 500 to 700 nm and a half value width of 100 nm or more in an absorption spectrum of a dilute solution normalized to an absorbance of 1.0,

wherein the black ink has a transition metal ion content of 0.1 mmol/l or less, and the black ink comprises a dye having an oxidation potential of more than 1.0 V (vs SCE).

5. The black ink for ink-jet recording according to claim 4, wherein the dye having a λ_{max} of 500 to 700 nm includes a dye having an oxidation potential of more than 1.0 V (vs SCE).

6. The black ink for ink-jet recording according to claim 1, which has a ratio R of 1.2 or less, in which the ratio R is defined as a ratio of a maximum value to a minimum value of a forced fading rate constants k_R , k_G and k_B that are decided by printing a black square symbol of JIS code 2223 in 48-point by using the black ink, measuring reflection densities D_R , D_G and D_B of the printed symbol with respect to 3 colors of C (cyan), M (magenta) and Y (yellow) through a status A filter to obtain initial densities, respectively, forcibly fading the printed symbol by an ozone fading tester capable of continuously

generating 5 ppm of ozone, and determining the times taken until the reflection densities D_R , D_G and D_B reach 80% of the initial densities, respectively.

7. The black ink for ink-jet recording according to claim 6, which comprises a dye having an oxidation potential of more than 1.0 V (vs SCE).

8. The black ink for ink-jet recording according to claim 2, which has: a forced fading rate constant k_{vis} of 5.0×10^{-2} [hour⁻¹] or less; and a ratio R of 1.2 or less,

in which the forced fading rate constant k_{vis} is decided by printing a black square symbol of JIS code 2223 in 48-point by using the black ink, measuring a reflection density D_{vis} of the printed symbol through a status A filter to obtain an initial density, forcedly fading the printed symbol by an ozone fading tester capable of continuously generating 5 ppm of ozone, and determining the time taken until the reflection density D_{vis} reaches 80% of the initial density, and

the ratio R is defined as a ratio of a maximum value to a minimum value of a forced fading rate constants k_R , k_G and k_B that are decided by printing a black square symbol of JIS code 2223 in 48-point by using the black ink,

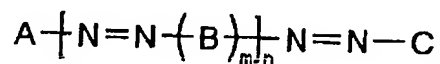
measuring reflection densities D_R , D_G and D_B of the printed symbol with respect to 3 colors of C (cyan), M (magenta) and Y (yellow) through a status A filter to obtain initial densities, respectively, forcedly fading the printed symbol by an ozone fading tester capable of continuously generating 5 ppm of ozone, and determining the times taken until the reflection densities D_R , D_G and D_B reach 80% of the initial densities, respectively.

9. The black ink for ink-jet recording according to claim 8, which comprises a dye having an oxidation potential of more than 1.0 V (vs SCE).

10. The black ink for ink-jet recording according to claim 3, which has a forced fading rate constant k_{vis} of $5.0 \times 10^{-2} \text{ hour}^{-1}$ or less, in which the forced fading rate constant k_{vis} is decided by printing a black square symbol of JIS code 2223 in 48-point by using the black ink, measuring a reflection density D_{vis} of the printed symbol through a status A filter to obtain an initial density, forcedly fading the printed symbol by an ozone fading tester capable of continuously generating 5 ppm of ozone, and determining the time taken until the reflection density D_{vis} reaches 80% of the initial density.

11. The black ink for ink-jet recording according to claim 10, which comprises a dye having an oxidation potential of more than 1.0 V (vs SCE).

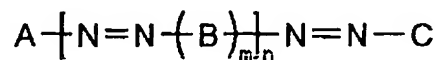
12. The black ink for ink-jet recording according to claim 1, which comprises a dye represented by the following general formula (1):



wherein A, B and C each independently represent an aromatic or heterocyclic group, which are substituted or unsubstituted; m is 1 or 2; n is an integer of 0 or more.

13. The black ink for ink-jet recording according to claim 12, wherein the dye represented by the general formula (1) includes a dye having a λ_{max} of 350 to 500 nm in an absorption spectrum of an aqueous solution.

14. The black ink for ink-jet recording according to claim 2, which comprises a dye represented by the following general formula (1):

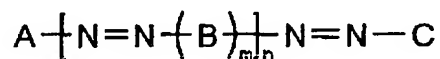


wherein A, B and C each independently represent an aromatic or heterocyclic group, which are substituted or

unsubstituted; m is 1 or 2; n is an integer of 0 or more.

15. The black ink for ink-jet recording according to claim 14, wherein the dye represented by the general formula (1) includes a dye having a λ_{max} of 350 to 500 nm in an absorption spectrum of an aqueous solution.

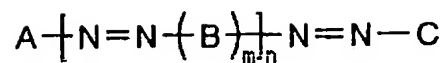
16. The black ink for ink-jet recording according to claim 3, which comprises a dye represented by the following general formula (1):



wherein A, B and C each independently represent an aromatic or heterocyclic group, which are substituted or unsubstituted; m is 1 or 2; n is an integer of 0 or more.

17. The black ink for ink-jet recording according to claim 16, wherein the dye represented by the general formula (1) includes a dye having a λ_{max} of 350 to 500 nm in an absorption spectrum of an aqueous solution.

18. The black ink for ink-jet recording according to claim 4, which comprises a dye represented by the following general formula (1):



wherein A, B and C each independently represent an aromatic or heterocyclic group, which are substituted or unsubstituted; m is 1 or 2; n is an integer of 0 or more.

19. The black ink for ink-jet recording according to claim 18, wherein the dye represented by the general formula (1) includes a dye having a λ_{max} of 350 to 500 nm in an absorption spectrum of an aqueous solution.